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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,518	03/02/2007	Auturo Fregoso-Infante	FREGOSO 1	2463

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EXAMINER	
TISCHLER, FRANCES	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,518	FREGOSO-INFANTE ET AL.	
	Examiner	Art Unit	
	Frances Tischler	4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/27/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 15 is objected to because of the following informalities:

(1) Applicant writes "…the reaction is brought to the boiling temperature of the alcoholic reaction media and at atmospheric temperature…" It is unclear which temperature applicant means to claim. Examiner assumes that applicant meant to write at atmospheric pressure.

(2) The last phrase ("the ethylene glycol and the alcoholic reaction media are separated and recovered") is redundant.

2. Claim 18 is objected to because of the informalities: Applicant writes "alkaline metal hydroxides or alkaline earth metal hydroxides." The first alkaline should be changed to alkali.

3. Claim 20 is objected to because of the following informalities: the language in the 4th line is unclear. It reads: "... sulfuric acid or hydrochloric acid are employed until an acid pH is achieved of the media where this reaction takes place…" "of" can be replaced with "in", or the whole underlined phrase can go before "is achieved", for example; or the whole sentence can be rewritten for clarification. Also, grammatically, "are" should be "is".

4. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 15, 17, 20 - 22 are rejected under 35 U.S.C. 102(a) as being anticipated by Yazaki et al (US 6,580,005).

7. Regarding claims 15 and 22: Yazaki discloses (abstract, column 2, lines 12 – 38, claims 1 - 3) a process for recycling PET waste comprising:

(a) a decomposition reaction with an alcohol and a base metal, the base metal being equi-molar or excess-molar relative to the PET, to form the salt of terephthalic acid and ethylene glycol

(b) a solid-liquid separation where the salt of the terephthalic acid is separated from the alcohol and water is added; the salt of terephthalic acid is dissolved in water while insoluble impurities are removed

(c) a crystallization step where a strong acid is added the solution of the salt of terephthalic acid to crystallize the latter

(d) a separation of the terephthalic acid crystals followed by washing them and drying them

(e) the alcohol used by Yazaki is ethylene glycol, which reads on applicant's alcohol. Therefore, the separation and recovery step of the ethylene glycol and alcohol as claimed by applicant is accomplished in step (b). The ethylene glycol can be returned to step (a) (column 2, lines 63 – end, column 3, lines 1 - 9).

8. The temperature of the decomposition reaction ranges from 130 to 180 ^{o}C, which is close to the boiling point of ethylene glycol, which is 197.3 ^{o}C (column 5, lines 41 – 58). Water is added in step (b) at 80 ^{o}C, reading on applicant's "below 90 ^{o}C" (column 12, lines 50 – 65).

9. The reaction is carried out at atmospheric pressures (column 17, lines 18 – 57).

10. Regarding claim 17: Yazaki discloses (column 1, lines 11 – 15) the use of spent PET from beverage bottles and the like.

11. Regarding claim 20: Yazaki discloses (column 13, lines 29 - 35) using sulfuric acid until the pH reaches about 2 to 4 at which point terephthalic ac id is precipitated out as crystals. Other acids such as hydrochloric acid, nitric acid, etc. can also be used.

12. Regarding claim 21: Yazaki discloses (abstract, column 2, lines 12 – 38, column 14, lines 37 – 64, claims 1 – 3) vacuum filtering, washing and purifying the terephthalic acid crystals.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yazaki et al (US 6,580,005).

16. Yazaki's disclosure is discussed above and is incorporated here by reference. Yazaki discloses using a base metal, but fails to teach the use exclusively of sodium hydroxide or potassium hydroxide.

17. Yazaki discloses (column 11, lines 55 – 65) that approximately 80% of the base metal should be sodium carbonate with 20% or less of alkali metal hydroxide, such as sodium hydroxide or potassium hydroxide, because containing the amount of NaOH or

KOH increases the efficiency of the decomposition reaction and, further, sodium carbonate is cheaper than sodium hydroxide.

18. The case law has held that "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d618, 195 USPQ 6 (CCPA 1977). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have varied the amount of sodium hydroxide and sodium carbonate as necessary through routine optimization to obtain the desired results of efficiency and cost.

19. Claims 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yazaki et al (US 6,580,005) in view of Pitat et al (GB 822,834) and Mays (US 3,801,273).

20. Yazaki's disclosure is discussed above and is incorporated here by reference. Yazaki discloses ethylene glycol as the alcohol used in the decomposition of PET but fails to teach a monohydric alcohol selected from alcohols with 4 to 8 carbon atoms as the alcohol.

21. Pitat discloses a method of recycling waste PET by reacting it with a metal hydroxide such as sodium hydroxide with an aqueous alcohol, such as methanol or

ethanol (examples 2 - 4) at approximately 100 °C (page 1, lines 41 – 53) at atmospheric pressures (page 2, lines 12 -13), acidifying the solution to precipitate the terephthalic acid (page 1, lines 75 – 80), washing and drying the precipitate.

Pitat teaches monohydric alcohols but fails to teach alcohols with 4 to 8 carbon atoms.

22. Mays discloses (abstract, column 4, lines 23 - 33) a method of recovering waste cellulosic fibers from polyesters by heating it to 212 – 275 °C, treating it with aqueous alkali metal hydroxide, such as sodium hydroxide or potassium hydroxide, and an alcohol. The alcohol can be aliphatic monohydroxy alcohols such as methyl, ethyl, propyl, butyl, etc., or dihydroxy alcohols such as ethylene glycol, diethylene glycol, propylene glycol, etc,

Discussion

23. Yazaki discloses decomposing PET with an alcohol and a metal base, specifically sodium carbonate, but fails to teach sodium hydroxide or potassium hydroxide. Pitat discloses decomposing PET with an alcohol and a metal base, specifically sodium hydroxide and potassium hydroxide. It would have been obvious to one of ordinary skill in the art to have exchanged Yazaki's sodium carbonate with Pitat's sodium hydroxide, since both reactions are substantially identical and accomplish the same purpose of decomposing PET with a metal base and an alcohol.

24. Yazaki discloses decomposing PET with a metal base and alcohol but uses ethylene glycol instead of a monohydric alcohol. Pitat discloses the use of a monohydric alcohol for the same purpose of decomposing PET with a metal base and an alcohol. Mays discloses using either a monohydric or a dihydric alcohol interchangeably. It would have been obvious to one of ordinary skill in the art to have used Yazaki's invention using Mays' monohydric alcohol with 4 or more carbon atoms, since Mays discloses that monohydric alcohols and diols can be used interchangeably and Pitat discloses that monohydric alcohols is used in the same type of reaction taught by Yazaki, which is to decompose PET with an alcohol and a base metal.

25. Additionally, applicant admits (page 6, lines 18 – 25) that mono or polyhydric alcohols can be used, and especially preferred is a methanol/ethanol mixture. Therefore, it would have been obvious to one of ordinary skill in the art to have used Pitat's methanol/ethanol or May's monohydric alcohols of more than 3 carbons in Yazaki's disclosure instead of the ethylene glycol, since both reactions (Yazaki's and Pitat's) accomplish the same purpose of decomposing PET with a base metal and an alcohol and applicant admits that these alcohols are interchangeable.

Examiner Information

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frances Tischler whose telephone number is (571)270-5458. The examiner can normally be reached on Monday-Friday 7:30AM - 5:00 PM; off every other Friday.

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ling-Siu Choi/
Primary Examiner, Art Unit 1796

Frances Tischler
Examiner
Art Unit 4171

/FT/